

## WHAT IS CLAIMED IS:

1. A virus formulation comprising:
  - a) a purified virus
  - b) a buffer;
  - c) a sugar;
  - d) a salt;
  - e) a divalent cation; and,
  - f) a non-ionic detergent.
2. A virus formulation of claim 1 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L.
3. A virus formulation of claim 1 with a virus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL, wherein the buffer is selected from a group of buffers acceptable for human parenteral use, preferably a Tris buffer, at a pH from about 7.5 to about 8.5.
4. A virus formulation of claim 3 wherein the sugar is sucrose at a weight to volume percentage from about 2% to about 7.5% and the salt is sodium chloride from about 25 mM to about 250 mM, such that the total osmolarity of the formulation is a range from about 200 mOs/L to about 800 mOs/L.
5. A virus formulation of claim 4 wherein the divalent cation is selected from the group consisting of  $\text{MgCl}_2$  and  $\text{CaCl}_2$  in an amount from about 0.1 mM to about 5 mM.
6. A virus formulation of claim 5 wherein the non-ionic detergent is selected from the group consisting of Polysorbate-80 and Polysorbate-40 at a concentration range from about 0.001% to about 2%.

7. A virus formulation of claim 1 with a concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L which comprises a about 5.0 mM Tris, at pH 8.0; sucrose in a weight to volume range of about 5%; NaCl at about 75 mM,  $\text{MgCl}_2$  at about 1 mM to 2 mM, and either Polysorbate-80 at a concentration of about 0.02% or Polysorbate-40 at a concentration of about 0.005%.

8. A virus formulation of claim 7 which wherein the formulation is buffered with about 5.0 mM Tris-HCl, at pH 8.0; sucrose is present a about 5%, NaCl is present at about 75 mM,  $\text{MgCl}_2$  at 1 mM, and Polysorbate-80 at 0.001% with the total osmolarity approximately 310 mOs/L.

9. A virus formulation of claim 2 comprising adenovirus and a formulation selected from the group consisting of formulation number A105, A110, A111, A126, A127, A128, A129, A130, A131, A155, A159, A160, A165, A167, A168, A169, A170, A171, A172 and A173.

10. A virus formulation comprising:  
a) a purified virus  
b) a buffer;  
c) a sugar;  
d) a salt;  
e) a divalent cation;  
f) a non-ionic detergent; and,  
g) an inhibitor of free radical oxidation.

11. A virus formulation of claim 10 with a concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L.

12. A virus formulation of claim 10 with a virus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL, wherein the buffer is selected from a group of buffers acceptable for human parenteral use, preferably a Tris buffer, at a pH from about 7.5 to about 8.5.

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13. A virus formulation of claim 12 wherein the sugar is sucrose at a weight to volume percentage from about 2% to about 7.5% and the salt is sodium chloride from about 25 mM to about 250 mM, such that the total osmolarity of the formulation is a range from about 200 mOs/L to about 800 mOs/L.

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14. A virus formulation of claim 13 wherein the divalent cation is selected from the group consisting of  $\text{MgCl}_2$  and  $\text{CaCl}_2$  in an amount from about 0.1 mM to about 5 mM.

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15. A virus formulation of claim 14 wherein the non-ionic detergent is selected from the group consisting of Polysorbate-80 and Polysorbate-40 at a concentration range from about 0.001% to about 2%.

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16. A virus formulation of claim 15 wherein the inhibitor of free radical oxidation is selected from the group consisting of ethanol, EDTA, an EDTA/ethanol combination, triethanolamine, and sodium citrate.

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17. A virus formulation of claim 10 with a concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L which comprises a about 5.0 mM Tris, at pH 8.0; sucrose in a weight to volume range of about 5%; NaCl at about 75 mM,  $\text{MgCl}_2$  at about 1 mM to 2 mM, either Polysorbate-80 at a concentration of about 0.02% or Polysorbate-40 at a concentration of about 0.005%, EDTA is present at about 100  $\mu\text{M}$  and ethanol at about 0.5%.

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18. A virus formulation of claim 17 which comprises about 5.0 mM Tris-HCl, at pH 8.0; sucrose at about 5%, NaCl at about 75 mM,  $\text{MgCl}_2$  from about 1 mM to 2 mM, Polysorbate-80 at about 0.005%, EDTA at about 100  $\mu\text{M}$  and ethanol at about 0.5%.

19. A virus formulation of claim 11 comprising adenovirus and a formulation selected from the group consisting of formulation number A105, A110, A111, A112, A121, A126, A127, A128, A129, A130, A131, A155, A159, A160, A165, A167, A168, A169, A170, A171, A172 and A173.
20. A virus formulation of claim 2 which further comprises plasmid DNA at a concentration from about 0.01 mg/mL to about 10 mg/mL.
21. A virus formulation of claim 11 which further comprises plasmid DNA at a concentration from about 0.01 mg/mL to about 10 mg/mL.
22. A formulation of claim 20 which comprises 5.0 mM Tris-HCl, at pH 8.0; sucrose at about 5%, NaCl at about 75 mM, MgCl<sub>2</sub> from about 1 mM to about 2 mM, Polysorbate-80 at about 0.005%, and plasmid DNA at about 1 mg/mL.
23. A virus formulation of claim 21 which comprises 5.0 mM Tris-HCl, at pH 8.0; sucrose at about 5%, NaCl at about 75 mM, MgCl<sub>2</sub> from about 1 mM to about 2 mM, Polysorbate-80 at about 0.005%, EDTA at about 100 µM, ethanol at about 0.5% and plasmid DNA at about 1 mg/mL.
24. A virus formulation comprising at least one inhibitor of free radical oxidation selected from the group consisting of ethanol, EDTA, an EDTA/ethanol combination, triethanolamine, and sodium citrate.
25. A virus formulation of claim 24 wherein a purified virus and the inhibitor(s) of free radical oxidation further comprise a buffer, a sugar, a salt, a divalent cation; and a non-ionic detergent.
26. A virus formulation of claim 25 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/ml and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L.

27. A virus formulation of claim 26 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL, wherein the buffer is selected from a group of buffers acceptable for human parenteral use, preferably a Tris buffer, at a pH from about 7.5 to about 8.5.

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28. A virus formulation of claim 27 wherein the sugar is sucrose at a weight to volume percentage from about 2% to about 7.5% and the salt is sodium chloride from about 25 mM to about 250 mM, such that the total osmolarity of the formulation is a range from about 200 mOs/L to about 800 mOs/L.

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29. A virus formulation of claim 28 wherein the divalent cation is selected from the group consisting of  $\text{MgCl}_2$  and  $\text{CaCl}_2$  in an amount from about 0.1 mM to about 5 mM.

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30. A virus formulation of claim 29 wherein the non-ionic detergent is selected from the group consisting of Polysorbate-80 and Polysorbate-40 at a concentration range from about 0.001% to about 2%.

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31. A virus formulation of claim 30 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L which comprises a about 5.0 mM Tris, at pH 8.0; sucrose in a weight to volume range of about 5%; NaCl at about 75 mM,  $\text{MgCl}_2$  at about 1 mM to 2 mM, and either Polysorbate-80 at a concentration of about 0.02% or Polysorbate-40 at a concentration of about 0.005%.

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32. A virus formulation of claim 31 wherein the formulation is buffered with about 5.0 mM Tris-HCl, at pH 8.0; sucrose is present a about 5%, NaCl is present at about 75 mM,  $\text{MgCl}_2$  at 1 mM, and Polysorbate-80 at 0.001% with the total osmolarity approximately 310 mOs/L.

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33. A virus formulation of claim 25 which further comprises plasmid DNA at a concentration from about 0.01 mg/mL to about 10 mg/mL.

34. A virus formulation of claim 26 which further comprises plasmid DNA at a concentration from about 0.01 mg/mL to about 10 mg/mL.
35. A method of preserving a purified virus wherein a formulation is generated which comprises the purified virus, a buffer, a sugar, a salt, a divalent cation, and a non-ionic detergent.
36. The method of claim 35 wherein the purified virus is adenovirus with a concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL, wherein the buffer is selected from a group of buffers acceptable for human parenteral use, preferably a Tris buffer, at a pH from about 7.5 to about 8.5.
37. The method of claim 36 wherein the sugar is sucrose at a weight to volume percentage from about 2% to about 7.5% and the salt is sodium chloride from about 25 mM to about 250 mM, such that the total osmolality of the formulation is a range from about 200 mOs/L to about 800 mOs/L.
38. The method of claim 37 wherein the virus formulation is selected from the group consisting of formulation number A105, A110, A111, A112, A121, A126, A127, A128, A129, A130, A131, A155, A159, A160, A165, A167, A168, A169, A170, A171, A172 and A173.
39. A method of preserving a purified virus wherein a formulation is generated which comprises the purified virus, a buffer, a sugar, a salt, a divalent cation, non-ionic detergent, and an inhibitor of free radical oxidation.
40. The method of claim 39 wherein the purified virus is adenovirus with a concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL, wherein the buffer is selected from a group of buffers acceptable for human parenteral use, preferably a Tris buffer, at a pH from about 7.5 to about 8.5.
41. The method of claim 40 wherein the sugar is sucrose at a weight to volume percentage from about 2% to about 7.5% and the salt is sodium chloride from

about 25 mM to about 250 mM, such that the total osmolarity of the formulation is a range from about 200 mOs/L to about 800 mOs/L.

5           42.     The method of claim 41 wherein the inhibitor of free radical oxidation is selected from the group consisting of ethanol, EDTA, an EDTA/ethanol combination, triethanolamine, and sodium citrate.

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15           44.     The method of claim 36 wherein the virus formulation further comprises plasmid DNA at a concentration from about 0.01 mg/mL to about 10 mg/mL.

20           45.     The method of claim 37 wherein the virus formulation further comprises plasmid DNA at a concentration from about 0.01 mg/mL to about 10 mg/mL.